Physics Praxis Cheat Sheet

by Tischler (MsRTischler) via cheatography.com/202291/cs/42928/

Nature of Science: 15 questions, 12%

Vector	magnitude **NO** direction Ex= speed, distance	
Scalar	magnitude & Direction. Ex= acceleration, displacement	
Significant Figures	all digits after the first *non-zero* are significant	
	ex: 0.00410 3 sig figs, 23840100 6 sig figs	
	leading zeros don't count	
	adding round to # with the fewest decimals	
Accuracy	ex:how close results are to the true value	
Precision	how close results are to one another	
Systematic Error	consistent error	
Acceleration	v/t	$1/2gt^2$
Weight	W=mg=mass X gravity	
Work	W=Force x distance	

Matter and Energy: 19 questions, 15%

Bohr model	electrons move in fixed orbitals (shells) and not anywhere in between and that each orbit (shell) has a fixed energy		
Particles	*alpha*= 2p,2n bound	*beta*=high energy, high speed electrons	*gamma*=shortest wavelength electromagnetic waves
Fission	breaks	releases energy ex. atom smashing	
Fusion	combines	releases energy ex. sun	
Energy transfer	*radiation*= emitted	*conduction*= touch	*convection*= fluids

Matter and Energy: 19 questions, 15% (cont)

Thermodynamics	*1st law*= conservation of energy	*2nd law*= entropy increases	*3rd law*= A perfect crystal at zero Kelvin has zero entropy
Ideal Gas Law	Boyle's law PV=nRT	pressure and volume of a gas have an inverse relationship	
Kinetic energy	energy of motion	$=1/2mv^2$	
Potential energy	stored energy	=mgh	
PE=KE	$mgh=1/2mv^2$	mgh=1/2mv+ mg(2R)	
ME= KE + PE	velocity b4 impact: square root (2gh)		

Waves: 21 questions, 17%

Transverse waves	motion in which all points on a wave oscillate along paths at right angles to the direction of the wave's advance. Ex Water ripples
Longitudinal waves	vibration of medium is parallel to the direction the wave travels and displacement of the medium is in the same direction of the wave propagation. Ex: sound
Mechanical waves	an oscillation of matter, and transfers energy through a material medium. ex: sound, water
Electromagnetic	formed when an electric field couples with a magnetic field. ex. light, gamma
Compression waves	the particle motion is in the same direction in which the wave is propagating i.e. longitudinal

By **Tischler** (MsRTischler)

cheatography.com/msrtischler/

Published 4th April, 2024.
Last updated 4th April, 2024.

Sponsored by **ApolloPad.com**
Everyone has a novel in them. Finish Yours!
https://apollopad.com

Waves: 21 questions, 17% (cont)

Doppler effect:	the change in the frequency of a wave in relation to an observer who is moving relative to the source of the wave
	moving away= longer towards=shorter
Sound	*Sonic boom*= shock waves created when an object travels through the air faster than the speed of sound
	sound barrier sudden increase in aerodynamic drag that happens when an object approaches the speed of sound
	Pitch=frequency *Loudness*=intensity

Waves pt 2: 21 questions, 17% (copy)

Snell's law:	relationship between angles of incidence & refraction
	refraction= the bending of light or sound as it passes through something like a wall (sound) or a window (light).
	reflection= the throwing back without absorbing it.
	n1sin01 = n2sin02 change in direction
Optics	*real image*= occurs where rays converge *virtual image*= rays only appear to diverge
	Polarization= division into two sharply distinct opposites
Lenses	*converging*= both sides of the lens curve outward it will bend light from distant objects inwards toward a single point, called the focal point

Waves pt 2: 21 questions, 17% (copy) (cont)

convex=refract and converge
further from lens the bigger the object appears
diverging=both sides of the lens curve inward and light from distant objects will bend outwards.
concave=refract and diverge, always smaller
+ behind lens - in front of lens
more lenses, - the focal length

Mechanics: 44 questions, 35%

Newton's 1st	*law of inertia*: objects at rest remain at rest
Newton's 2nd	F=ma: the greater the mass the more force needed to accelerate
Newton's 3rd	every action has an equal and opposite reaction
Kepler's 1st	all planets move in an elliptical orbit around the sun
Kepler's 2nd	planets will move slowly far away from the sun, and faster closer to the sun
Kepler's 3rd	the square of the period of any planet is proportional to the cube of the axis of the orbit.
Friction	force that resists the sliding/rolling of a solid object over another
Bernoulli's principle	an increase in speed of a fluid simultaneously with a decrease in pressure or a decrease in the fluid's PE
Uniform circular motion	*centripetal* acceleration, net force is directed to the center

Sponsored by **ApolloPad.com**
Everyone has a novel in them. Finish Yours!
https://apollopad.com

Mechanics: 44 questions, 35% (cont)

	increasing radius decreases force
	$F=m(v^2/r)\cos 0$
Rotational motion	motion of an object around an axis. *w=0/t*
Harmonic motion F = *-kx*	**Hooke's law** the force exerted by a spring is proportional to its length
Collisions	*elastic*- momentum conserved ex. pool balls move apart
	inelastic- momentum not conserved ex. 2 cars stuck together, move together
Centripetal force	increase radius, decrease the force. $F=m(v^2/r)\cos 0$
Bouyant force F = -pgV	the upward force exerted on an object immersed in a fluid
Displacement	D=VT=velocityXtime
Vectors	add or subtract by placing tip to tail
Pascal's principle	The pressure at any point in the fluid is equal in all directions.
	pressure input = pressure output
modulus	*bulk*= reaction to squeezing
	elastic= ratio of stress to strain
	young= elasticity and length
	shear= elasticity and stress
Pendulums	Time=2pi(square root (length/gravity))
	freq (displacement) = amplitude sin (ang freq * t)

Electricity & Magnetism: 26 questions, 21%

Coulomb's law F = $k(q1q2)/r^2$	the force of attraction/repulsion between 2 charged bodies is proportional to the product of their charges and inversely proportional to the square of the distance between them

Electricity & Magnetism: 26 questions, 21% (cont)

Conductors	allows the movement of electrons and ions through. Ex. copper, gold, silver, steel, aluminium & brass
	have moveable charges
Insulators	don't allow electric current to pass through, electrical resistance. Ex. glass, plastic, rubber, air, & wood
Ohm's law V = IR	the relationship between voltage, current & resistance in an electrical circuit.
Biot-Savart law	describes the magnetic field generated by a constant electric current
Lorentz force	combination of electric and magnetic force on a point charge due to electromagnetic fields. *to determine the direction of the magnetic force on a positive moving charge, point right thumb in the direction of the velocity (v), index finger in the direction of the magnetic field (B), and middle finger will point in the direction of the the resulting magnetic force*

Sponsored by **ApolloPad.com**
Everyone has a novel in them. Finish Yours!
https://apollopad.com

Electricity & Magnetism: 26 questions, 21% (cont)

Ampere's law	the sum of the length elements times the magnetic field in the direction of the length element will be equal to the permeability times the electric current.	
Lenz's law	direction of the electric current induced in a conductor by a changing magnetic field, the magnetic field created by the induced current opposes changes in the initial magnetic field	
Kirchoff's laws	sum of all currents entering a junction must equal the sum of all currents leaving the junction	
Electric field	the electric force per unit charge	
Electric potential V = k(q/r)	amount of work energy needed per unit of electric charge to move the charge from a reference point to a specific point in an electric field	
	the stronger the field= more potential	
I=V/R	V=IR	R=V/I
Series	one path	Rt=R1+ R2+R3....
	It= I1 =I2	Vt = V1 + V2
Parallel	many paths	1/Rt=1/R1+1/R2...
	It = I1 + I2	Vt = V1 =V2

Electricity & Magnetism: 26 questions, 21% (cont)

	decrease resistance= decrease length, increase radius
	total resistance is less than individual
Gauss's law	how much of something is INSIDE a completely closed surface by measuring how much is flowing out through the sides of that surface.
	the electric flux Φ across any closed surface is proportional to the net electric charge q enclosed by the surface
Magnetic field	F= qvB sin 0, where q is the magnitude of the charge, B is the magnitude of the magnetic field, v is the speed, and is the angle of the velocity with respect to the field. As increases from 0° to 90°, the force increases.

By **Tischler** (MsRTischler)

cheatography.com/msrtischler/

Published 4th April, 2024.
Last updated 4th April, 2024.

Sponsored by **ApolloPad.com**
Everyone has a novel in them. Finish Yours!
https://apollopad.com